

What is claimed is:

1. A lamp lighting apparatus for lighting a discharge lamp in which discharge medium is encapsulated and a pair of electrodes are provided, the lamp lighting apparatus comprising:

a discharge drive circuit for supplying discharge current to the discharge lamp;

a voltage conversion circuit for boosting voltage from a DC power and supplying the boosted voltage to the discharge drive circuit; and

an arc discharge detecting circuit for detecting that a state of discharge of the discharge lamp changes to arc discharge, and outputting an arc discharge transition signal to the voltage conversion circuit,

wherein when the voltage conversion circuit receives the arc discharge transition signal which shows that the transition to the arc discharge does not take place, the voltage conversion circuit supplies a first voltage or higher to the discharge drive circuit, and when the voltage conversion circuit receives the arc discharge transition signal which shows that the transition to the arc discharge takes place, the voltage conversion circuit supplies a second voltage lower than the first voltage to the discharge drive circuit.

2. The lamp lighting apparatus according to claim 1, wherein the voltage conversion circuit comprises a boost chopper, and when the voltage conversion circuit receives the arc discharge transition signal which shows that a state of the discharge changes to the arc discharge, an operation of the voltage conversion circuit is suspended.

3. The lamp lighting apparatus according to claim 1, further comprising a starter for initiating the discharge lamp, wherein a predetermined maximum continuing time for repeat trials of discharge initiation is set, and after an arc discharge transition waiting period beginning from an initiation of an operation of the starter expires, the discharge drive circuit recognizes that it is detected that the state of the discharge changes to the arc discharge.

4. The lamp lighting apparatus according to claim 3, wherein the arc discharge transition waiting period is determined by adding the a maximum continuing time and a maximum necessary time required from an initiation of the discharge of the discharge lamp to a completion of the transition of the arc discharge.

5. The lamp lighting apparatus according to claim 2, further comprising a starter for initiating the discharge lamp, wherein a predetermined maximum continuing time for repeat trials of discharge initiation is set, and after an

arc discharge transition waiting period beginning from an initiation of an operation of the starter expires, the discharge drive circuit recognizes that it is detected that the state of the discharge changes to the arc discharge.

6. The lamp lighting apparatus according to claim 5, wherein the arc discharge transition waiting period is determined by adding the a maximum continuing time and a maximum necessary time required from an initiation of the discharge of the discharge lamp to a completion of the transition of the arc discharge.